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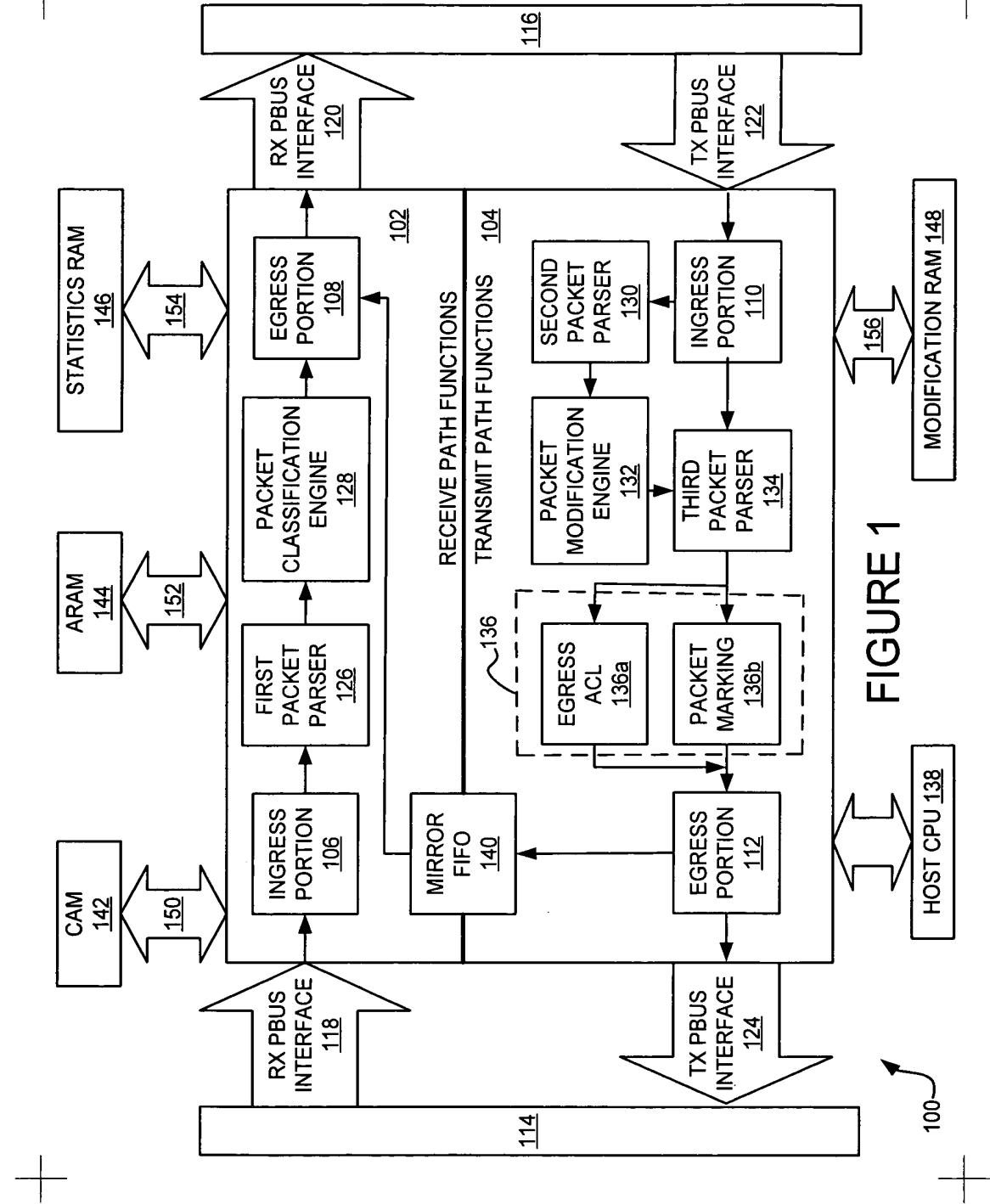
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**FIGURE 1**

BIT	FUNCTION	DESCRIPTION
15-0	PTI	PORT TAG INDEX.
19-16	EQoS	EGRESS QUEUE SELECT.
23-20	LAI	LAI INDEX.
24	JUMBO	EGRESS JUMBO CHECK FLAG.
25	DON'T FRAG	DON'T FRAGMENT FLAG.
26	IF TYPE	INGRESS INTERFACE TYPE. 0 = ETHERNET, 1 = POS INTERFACE.
27	-	RESERVED.
28	ROUTE	ROUTE FLAG.
29	RED	RANDOM EARLY DROP.
31-30	CTL	AFH FORMAT TYPE.
51-32	TXMI	TRANSMIT MODIFICATION INDEX.
58-52	CQoS	CPU QUEUE SELECT.
59	CPU COPY	CPU COPY FLAG.
60	REDIRECT	REDIRECT FLAG.
61	SSAMPLE	STATISTICAL SAMPLE FLAG.
62	LEARN	LEARN FLAG. REQUESTS OT TO SEND A COPY OF THE PACKET TO THE CPU FOR LEARN PROCESSING.
63	EMIRROR	EGRESS MIRROR.
75-64	IQoS	INGRESS QUEUE SELECT.
78-76	EMRk SEL	EGRESS MARK SELECT.
81-79	EMRk MASK	EGRESS MARK MASK.
82	IMIRROR	INGRESS MIRROR.
83	PERR KILL	PARITY ERROR KILL.

FIGURE 2

200

204

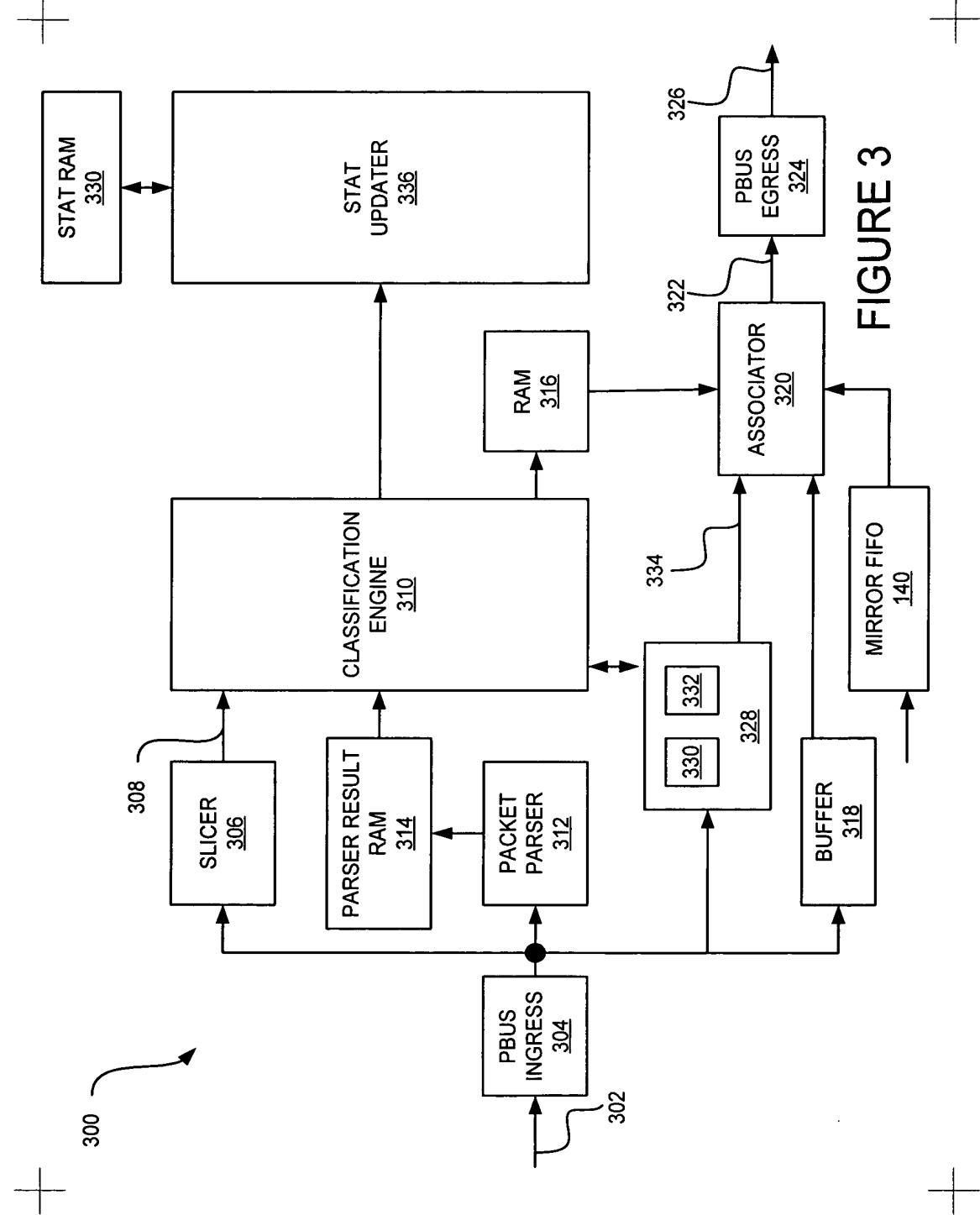


FIGURE 3

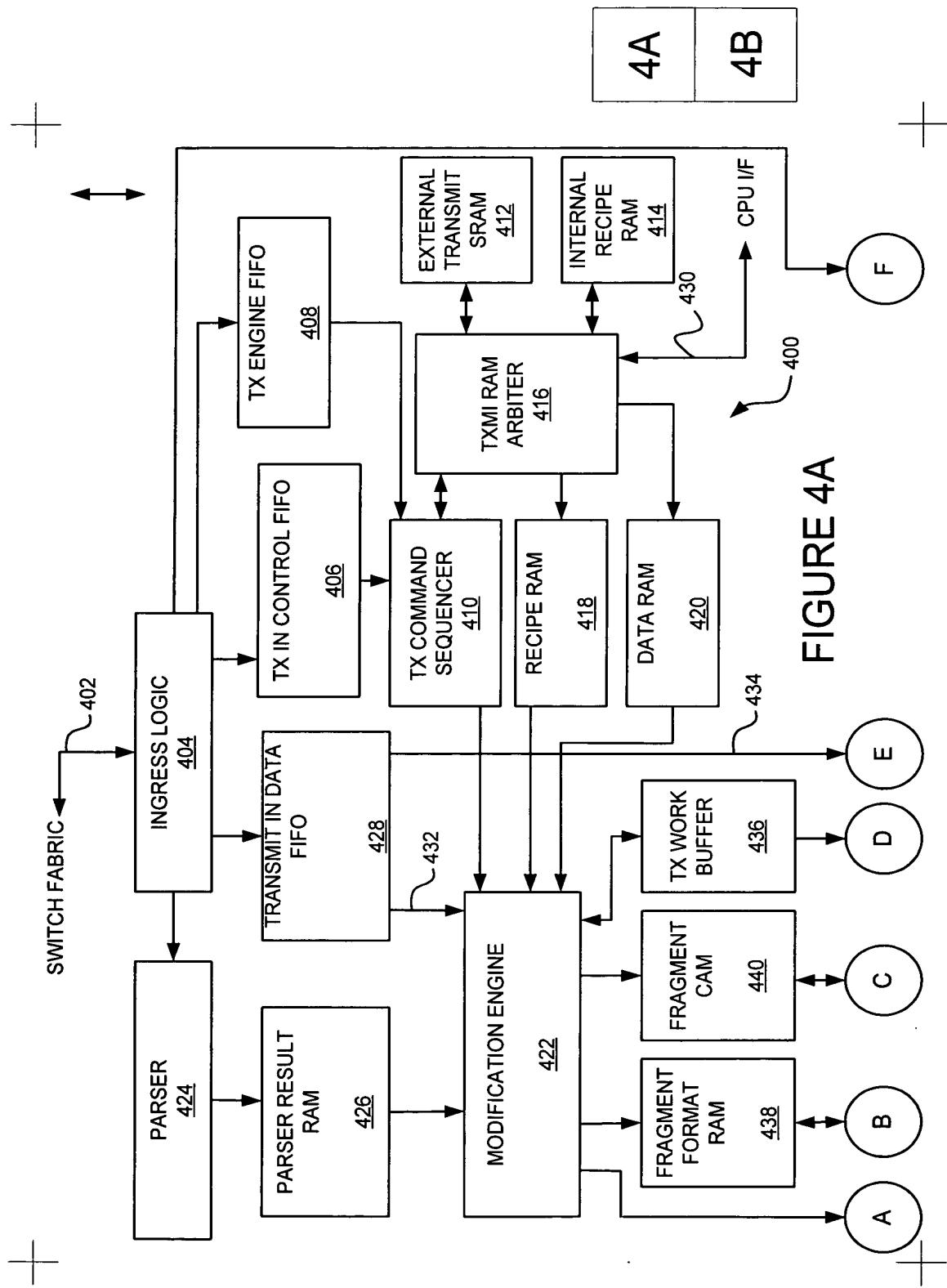
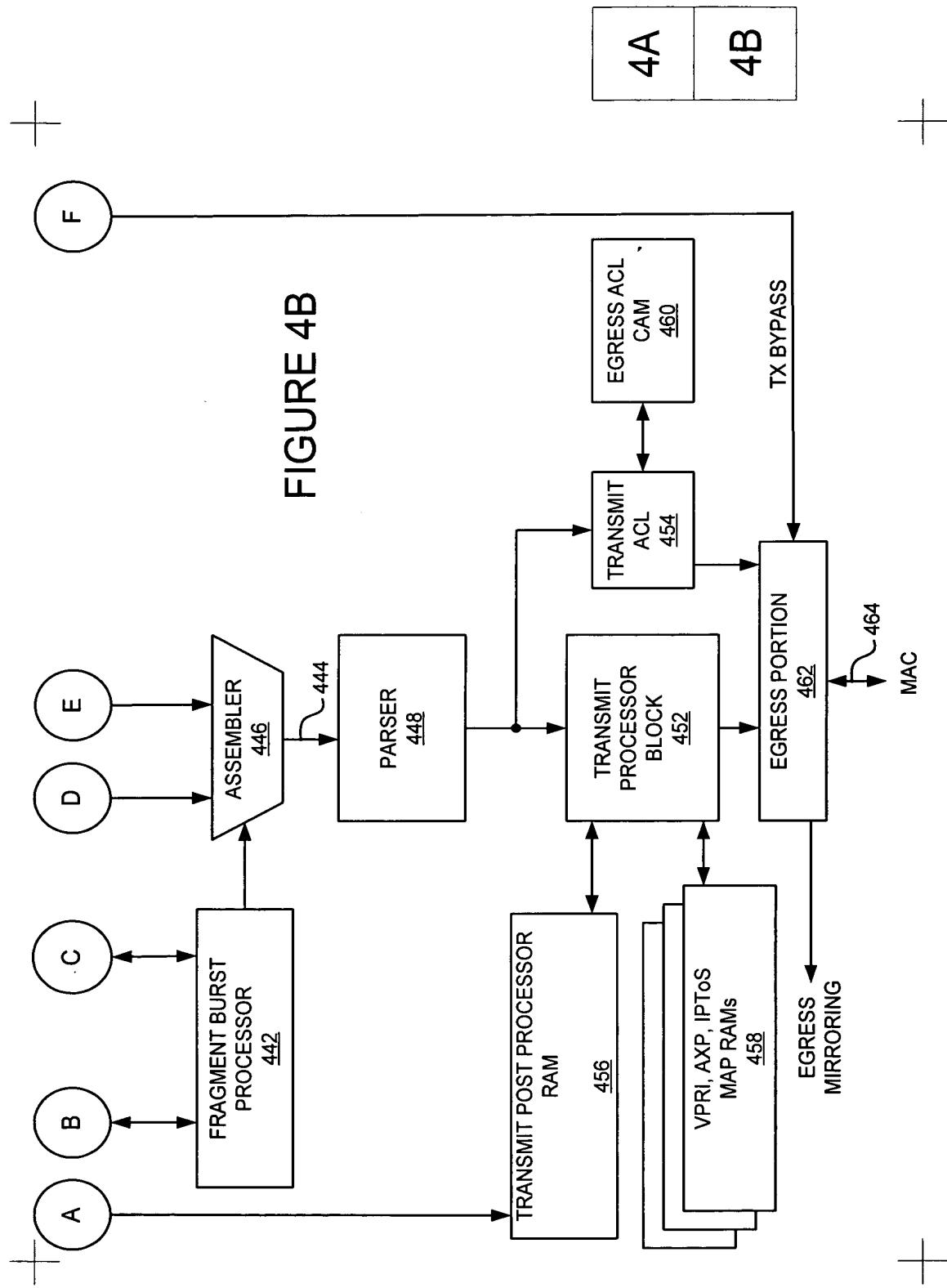


FIGURE 4B



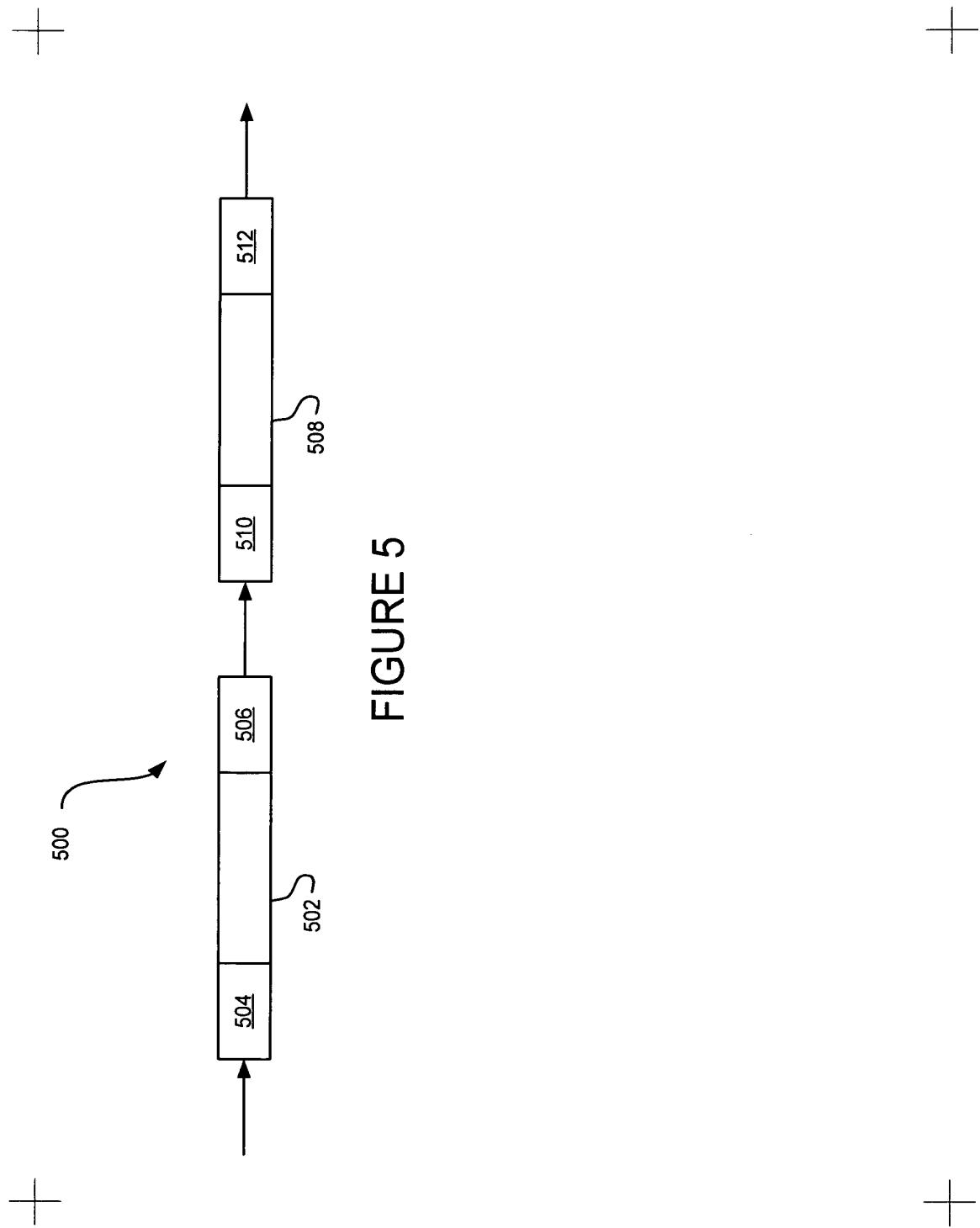
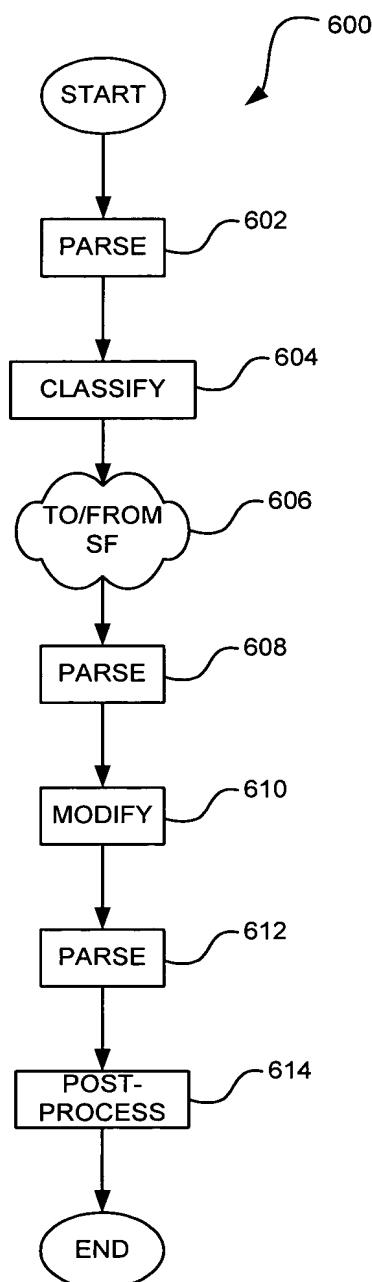


FIGURE 5



**FIGURE 6**

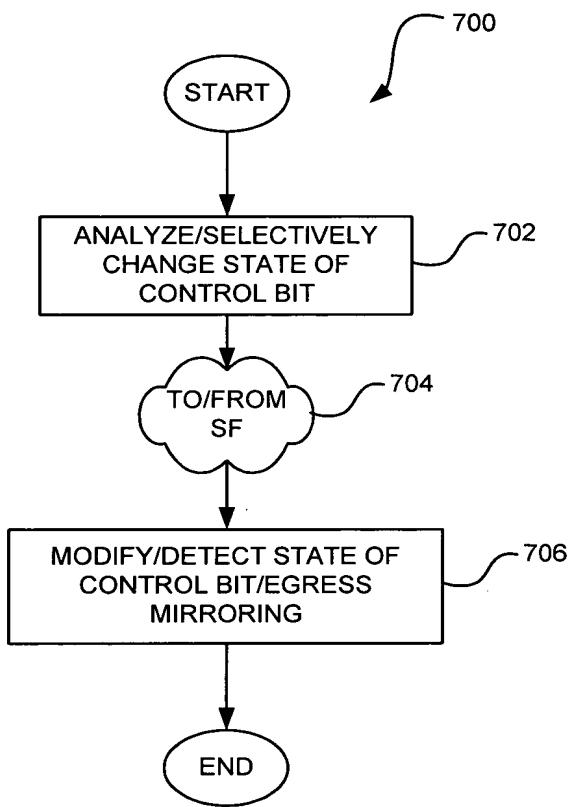
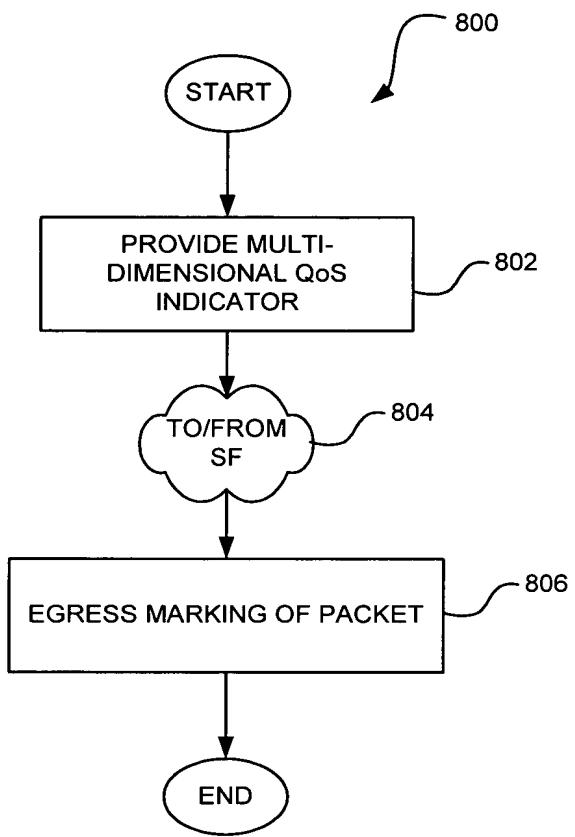
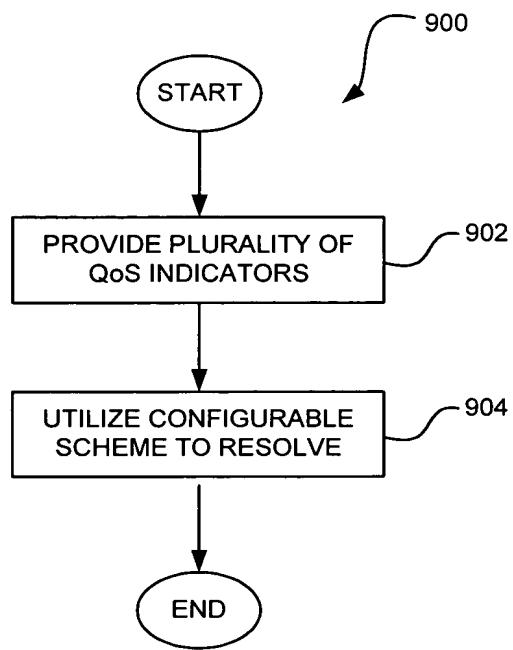


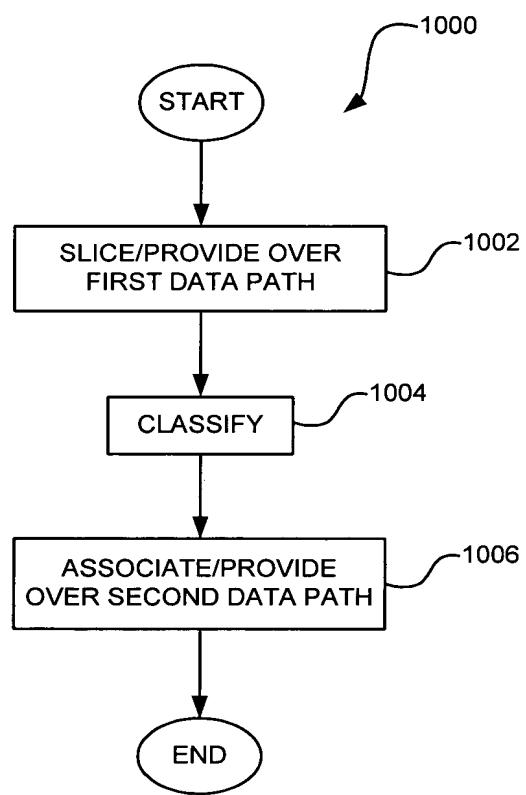
FIGURE 7



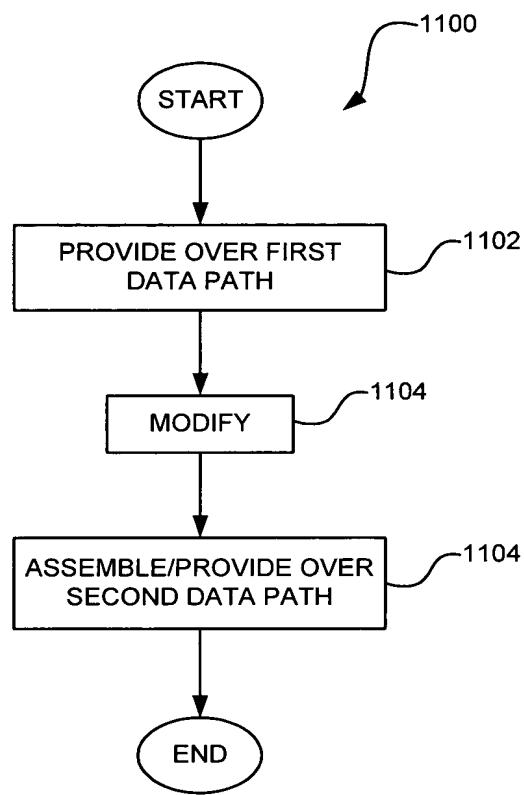
**FIGURE 8**



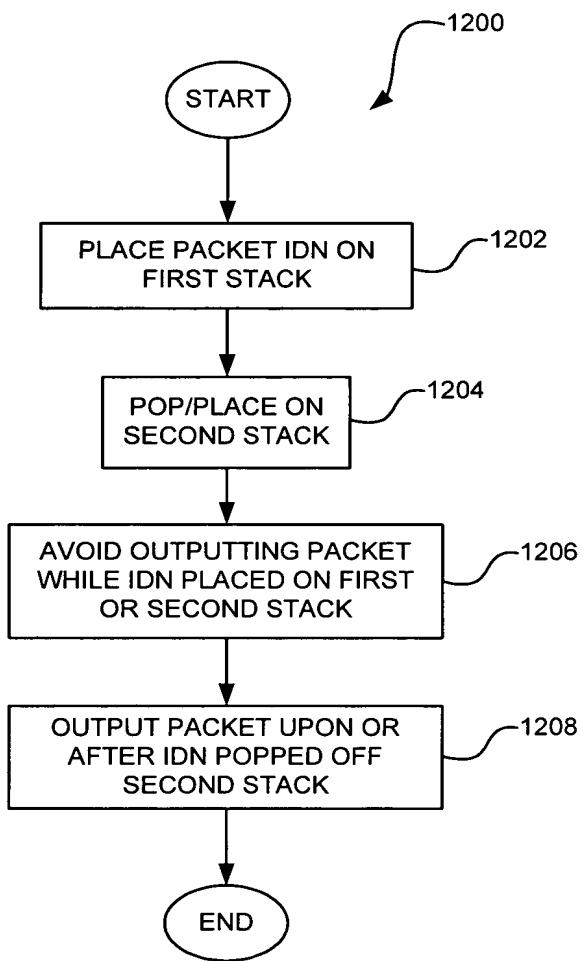
**FIGURE 9**



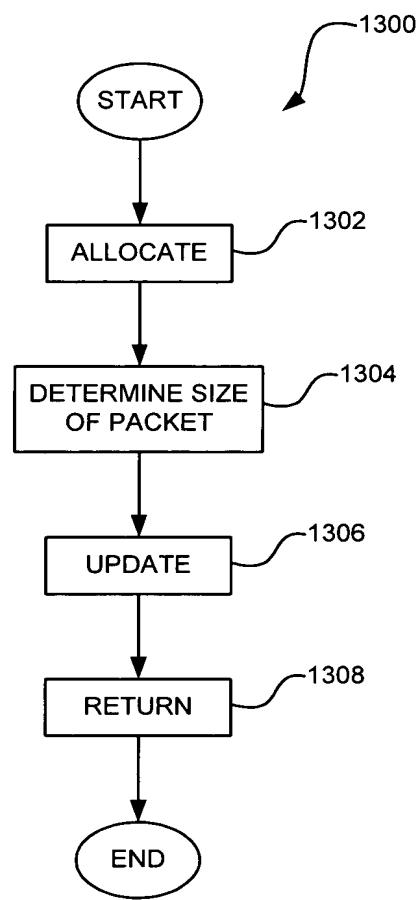
**FIGURE 10**



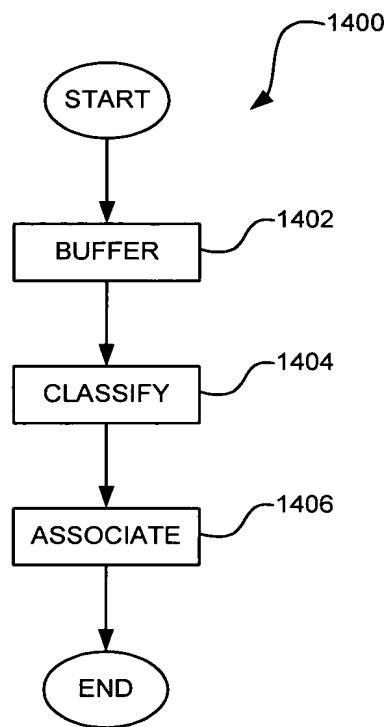
**FIGURE 11**



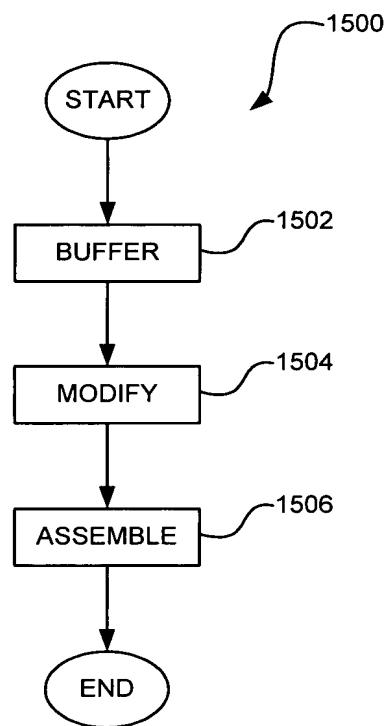
**FIGURE 12**



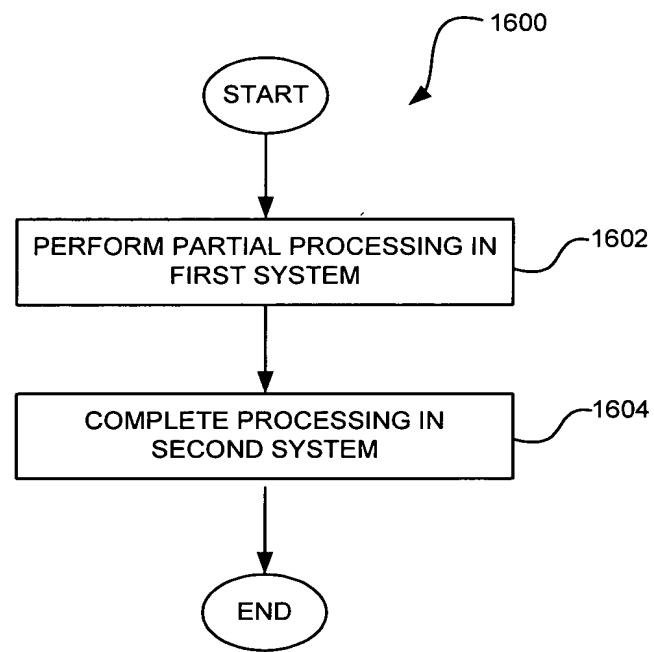
**FIGURE 13**



**FIGURE 14**



**FIGURE 15**



**FIGURE 16**

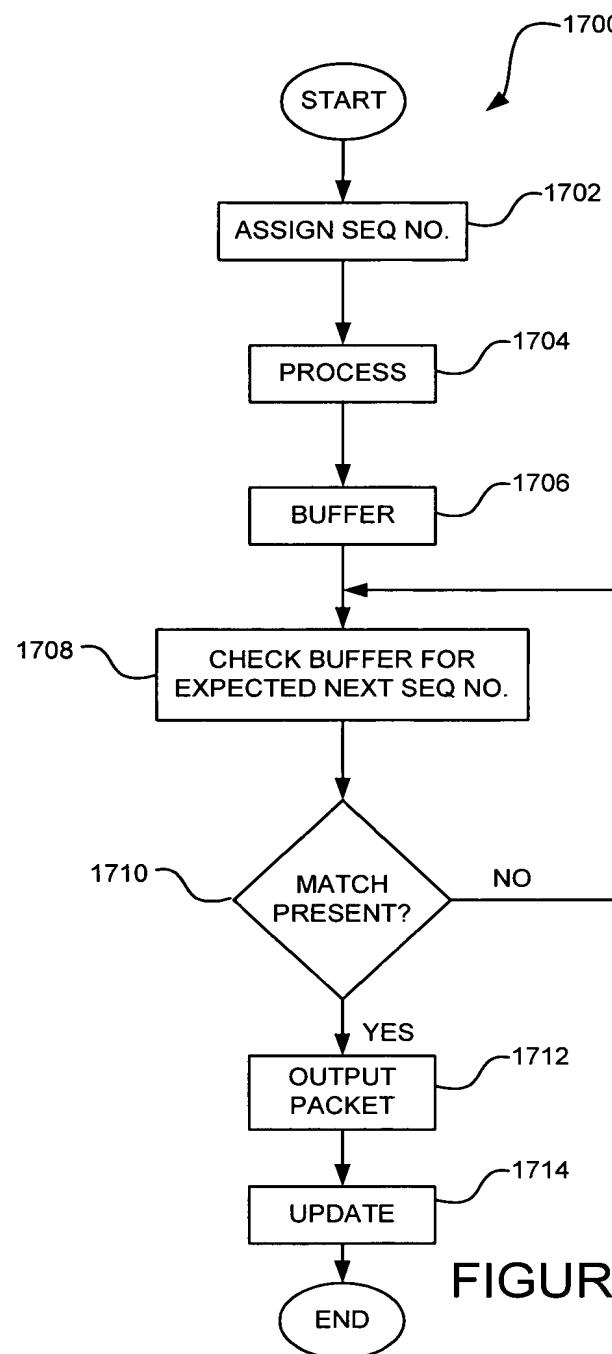


FIGURE 17

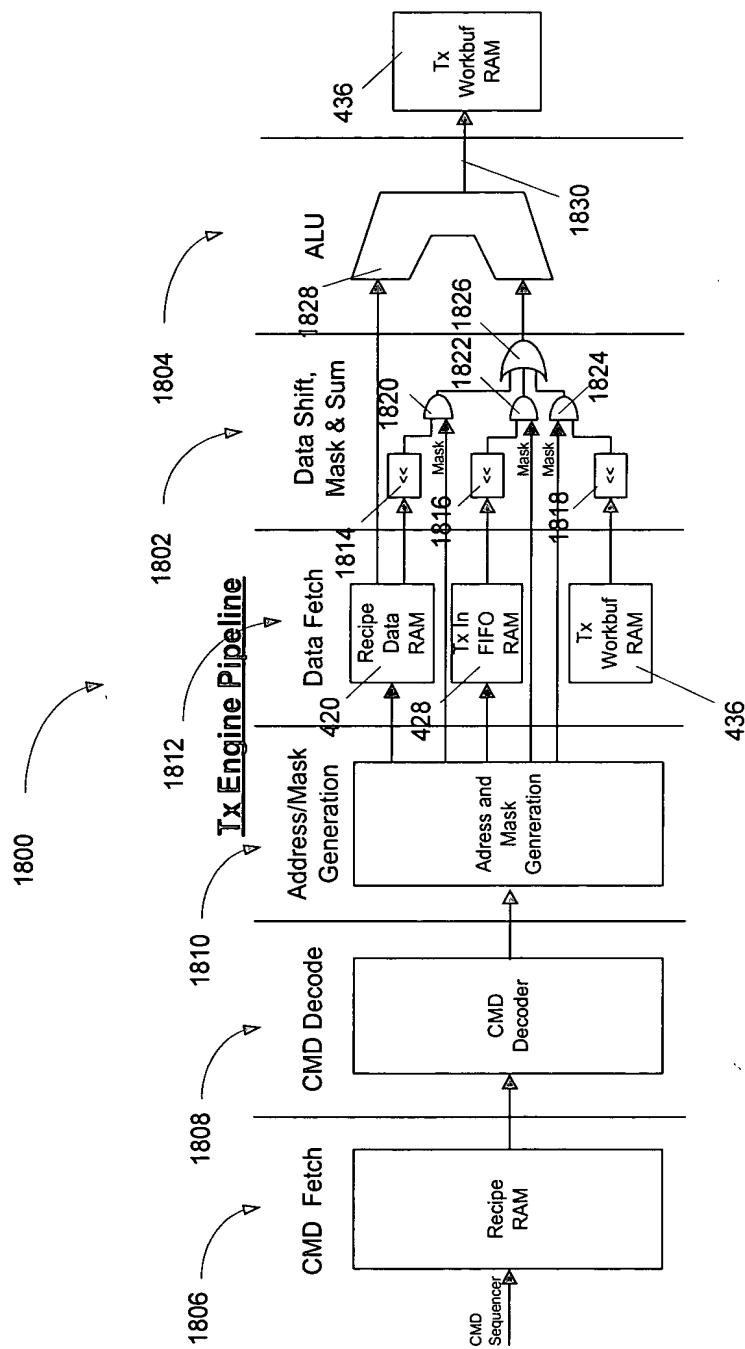


FIGURE 18

1900

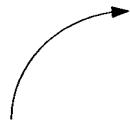


#### 10.4.1.1. External Link Entry Format

Bit	Function	Description
17-0	BURST ADDR 0	Burst Address 0.
21-18	BURST LEN 0	Burst Length 0.
41-32	BURST ADDR 1	Burst Address 1.
45-42	BURST LEN 1	Burst Length 1.
49-46	BURST ADDR 2	Burst Address 2.
53-50	BURST LEN 2	Burst Length 2.
70	INTEXT	Internal Descriptive
71	PK	Priority bit. Shows that there is only Priority setting in the entry table.

FIGURE 19

2000



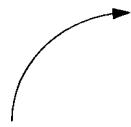
10.4.1.2. Internal Link Entry Format

Bit	Description	Description
39-30	BLURST ADDR 1	Blurst Address 1.
25-21	BLURST LEN 1	Blurst Length 1.
46-36	BLURST ADDR 2	Blurst Address 2.
31-27	BLURST LEN 2	Blurst Length 2.
62-32	INTREC16 INDEX	Internal Recipe Index.
63-63	INTREC16 LEN	Internal Recipe Length.
63-68	-	Reservval
70	INTENT	Internal/External.
71	PAR	Parity [3]. Set so that there is odd parity across bits 71-0 of the entry data.

FIGURE 20

#### 10.4.14. Data Entry Format

2100



Bit	Function	Description
31-0	DATA 0	Data Segment 0.
35-32	DATA 128	Data Segment 1.
63-36	DATA 1	Data Segment 1.
70-68	-	Reserved.
71	PARITY	Parity Bit. Set so that there is odd parity across bits 710 to the entry data.

FIGURE 21A

FIGURE 21B

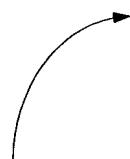
Memory Header (44 bytes) - Commit			
71	70	69:36	95:34
Empty	Compressed (n+1) / void	Command (n+1)	Reserved
			CommitAnd (n)

FIGURE 22

## FIGURE 23

2300

2400



Context	Context Name	Location
C0	NULL	The very first byte of the packet including AFIH
C1	L2	The start of the MAC header
C2	Ethertype	The start of the EtherType field (if present)
C3	MPLS	The start of the MPLS header(s) (if present)
C4	L3 Outer	The start of the outer L3 header
C5	L3 Inner	The start of the inner L3 header
C6	L4	The start of the TCP/UDP/RTP Header

FIGURE 24

FIGURE 25

Opcode	Command Name/onic	Control Information	Data Fields
00000	TXM_CMD_NOP	-	-
00001	TXM_CMD_INSERT	Offset, Length	Insertion Data
00010	TXM_CMD_DELETE	Offset, Length	-
00011	TXM_CMD_REPLACE	Offset, Length	Replacement Data
00100	TXM_CMD_REPLACE_MASK	Offset, Length	Replacement Data/ Mask
00110	TXM_CMD_COPY	Offset Source, Offset Destination, Length	-
00111	TXM_CMD_COPY_INS	Offset Source, Offset Destination, Length	Copy Mask
01000	TXM_CMD_COPY_INS_MASK	Offset Destination, Length	Copy Mask
01001	TXM_CMD_MACRO1	VIDE, MACST flags, MAC DA, MAC SA	MAC DA, MAC SA
01010	TXM_CMD_MACRO2	VIDE, MACST flags, MAC DA, MAC SA	MAC DA, MAC SA
01011	RESERVED	-	-
01100	TXM_CMD_AC1	Index, VPORT	-
01110	TXM_CMD_EMIC_VPRI	WRI-EXP EMC Fields	-
01111	TXM_CMD_EMIC_UPROS	PROS EMC fields	-
10000	TXM_CMD_INCREMENT_INSERT	Offset, Length	-
10001	TXM_CMD_INCREMENT_REPLACE	Offset, Length	-
10010	TXM_CMD_DECREMENT	Offset, Length	-
10011	TXM_CMD_AND	Offset, Length	ALU Data
10100	TXM_CMD_OR	Offset, Length	ALU Data
10101	TXM_CMD_XOR	Offset, Length	ALU Data
10110	TXM_CMD_ADD	Offset, Length	ALU Data
10111	TXM_CMD_SUB	Offset, Length	ALU Data
11000	TXM_TTI_DECREMENT	MACST/BCAST Flags	TTI, decrement limit registers
11001	TXM_TC_INCREMENT	-	TC limit register
11010	TXM_TTI_DECREMENT_INS	MACST/BCAST Flags	TTI, decrement limit registers
11011	TXM_TC_INCREMENT_INS	-	TC limit register
11100	Reserved	-	-
11111		-	-

txmi_cmd_replace_da	(Context: L2, Offset: 0, Length 6)
txmi_cmd_data	MAC DA (6 bytes external)
txmi_cmd_replace	(Context: L2, Offset: 6, Length 6)
txmi_data	MAC SA (6 bytes external)
txmi_cmd_replace_sa	(Context: L2, Offset: 6, Length 6)
txmi_data	Internal SA Pointer
txmi_cmd_replace	(Context: L2, Offset: 14, Length 2)
txmi_data	VLAN (2 bytes external)

- OPT1: If configuration register flag (use\_intel\_mac\_sa) is set to 0 then the MAC SA will be read from the external TXM RAM.
- OPT2: If configuration register flag (use\_intel\_mac\_sa) is set to 1 then the MAC SA data will come from the internal register in the source field of the command (0 - 15).
- OPT3: If the VDEL flag is set to 1 the VLAN field will be deleted else the VLAN field will be replaced with external TXM data.

FIGURE 26

txmi_cmd_replace_da	(Context: L2, Offset: 0, Length 6)
txmi_cmd_data	MAC DA (6 bytes external)
OPT1: txmi_cmd_replace	(Context: L2, Offset: 6, Length 6)
txmi_data	MAC SA (6 bytes external)
OPT2: txmi_cmd_replace_sa	(Context: L2, Offset: 6, Length 6)
txmi_data	Internal SA Pointer

OPT3: txmi_cmd_vlan_delete	(Context: L2, Offset: 14, Length 2)
----------------------------	-------------------------------------

- OPT1: If configuration register flag (use\_intel\_mac\_sa) is set to 0 then the MAC SA will be read from the external TXM RAM.
- OPT2: If configuration register flag (use\_intel\_mac\_sa) is set to 1 then the MAC SA data will come from the internal register in the source field of the command (0 – 15).
- OPT3: If the VDEL flag is set to 1 the VLAN field will be deleted else the txmi\_cmd\_vlan\_delete command will be converted to a txmi\_cmd\_nop command.

FIGURE 27

```
if broadcast IP packets
  if (TTL>IPbroadcast_TTL_Limit[sub_channel])
    Decrement TTL
    continue with next operation
  else
    Drop the packet
  else if multicast IP packets
    if (TTL>IPmulticast_TTL_Limit[sub_channel])
      Decrement TTL
      continue with next operation
    else
      Drop the packet
  else /* Must be unicast IP packets
    if (TTL>IPunicast_TTL_Limit[sub_channel])
      Decrement TTL
      continue with next operation
    else
      Drop the packet
```

FIGURE 28

```
if (TC<TC_Limit[sub_channel])  
    Increment TTL  
  
    continue with next operation  
else  
    Drop the packet
```

FIGURE 29

FIGURE 30

Parameter Terms for the IX ACL Block			
133.201	128.201	119.41	13.01
Upcode	Reserved	W-ORI	Wmax

FIGURE 31

1X4 Command Format for the IX Processor block			
Opcode	VRRI-EXP / IPROS EMC Command	2881	1711
133281			

Error Flag	Error Description	Action
0	ALU & Copy commands > packet size	Flag packet to be killed
1	Destination address is ahead of current read pointer	Flag packet to be killed
2	ALU & Copy commands > packet size	Flag packet to be killed
3	Reserved Opcode detected in the pipeline	Flag packet to be killed
4	Context1 < Context0	Flag packet to be killed
6	Context2 < Context1	Flag packet to be killed
7	Context3 < Context2	Flag packet to be killed
8	Context4 < Context3	Flag packet to be killed
9	Context5 < Context4	Flag packet to be killed
10	Context6 < Context5	Flag packet to be killed
11	TTL < limit or TC > limit	Flag packet to be killed
12	TXM IN DATA RAM Parity Error	Flag packet to be killed
13	TX Workbuf Parity Error	Flag packet to be killed
14	TRAM or Internal Recipe RAM Parity Error	Flag packet to be killed
15	Packet modification > 0x80	Flag packet to be killed

FIGURE 32

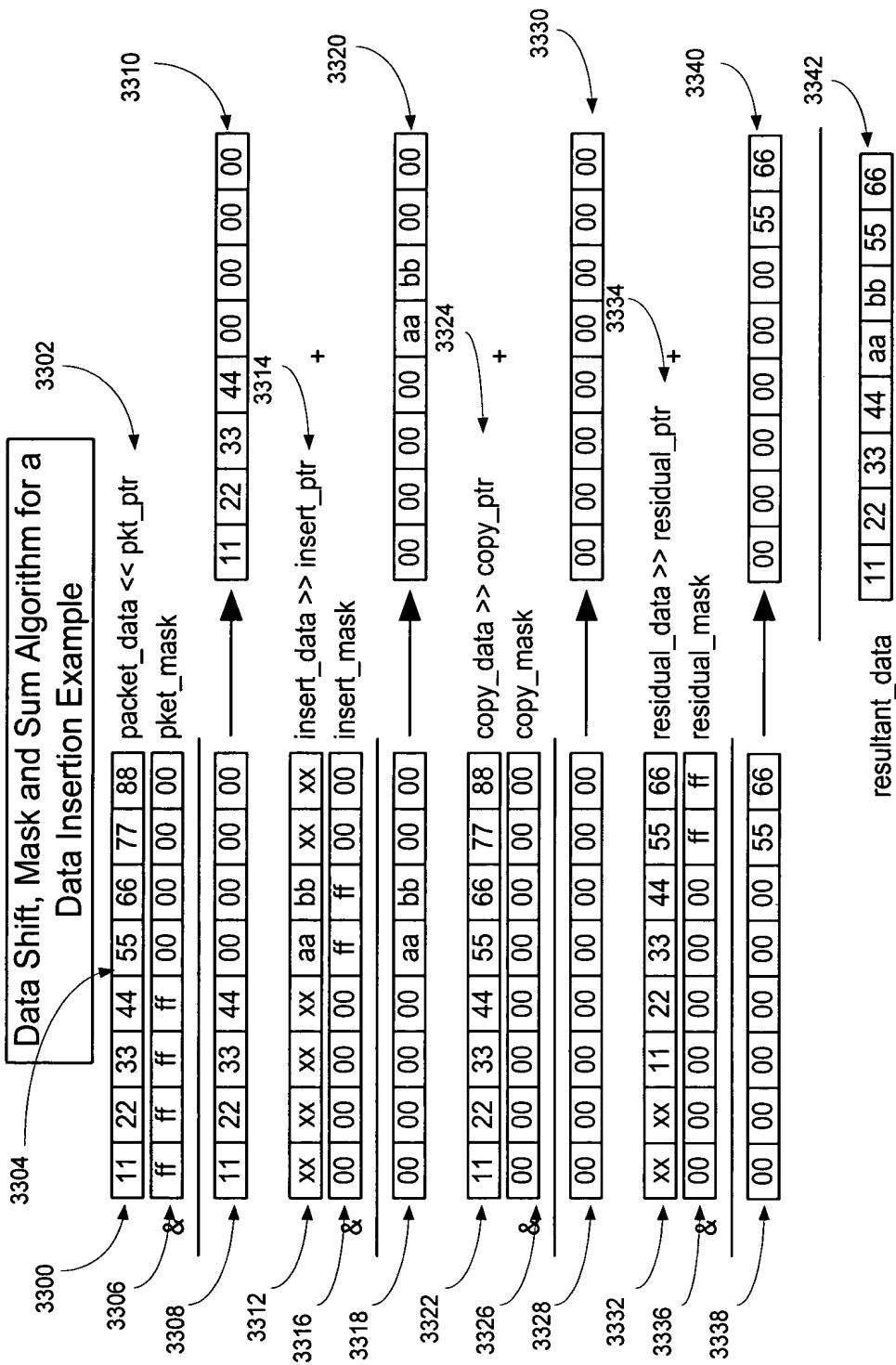
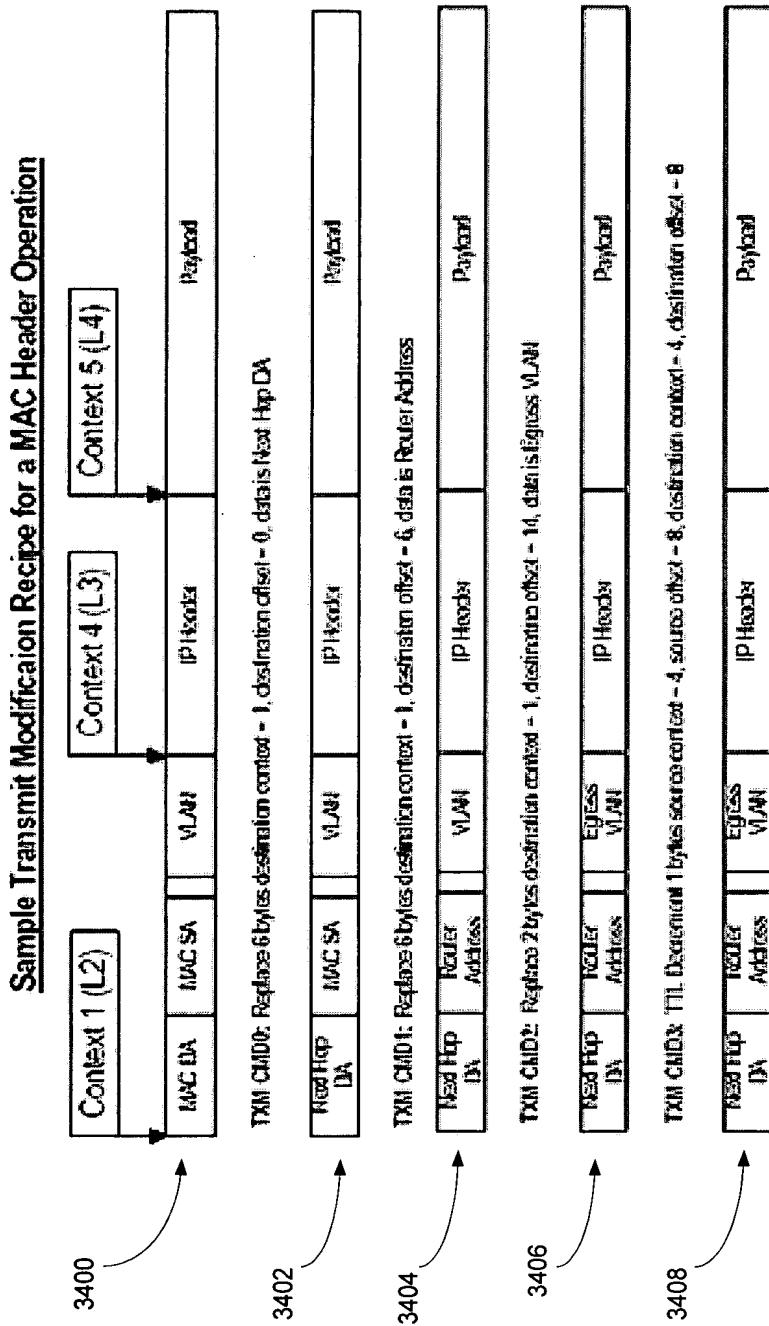


FIGURE 33

FIGURE 34



Forwarding Process Operation	Modification Type	Size (Bytes)	Packet Offset(s)
Next Hop MAC DA Replacement	Replace	6	0 (MAC)
Next Hop VLAN ID Replacement	Masked Replace	2	12 (MAC)
Source Address Insertion	Replace	6	6 (MAC)
TTL Decrement IPv4	Decrement	1	8 (NETWORK)
MPLS Stack Single Entry Add/Delete	Insert / Delete	4	0 (MPLS)
MPLS Stack Double Entry Add/Delete	Insert / Delete	8	0 (MPLS)
MPLS Label Change	Replace (could be masked to preserve CoS bits)	4	0 (MPLS)
MPLS TTL Decrement	Decrement	1	3 (MPLS)
MPLS TTL Copy	Copy	1	3 (MPLS) to 8 (NETWORK)
MPLS EtherType	Replace	2	0 (LLC)
Replace/Restore			
IP v4 Encapsulate/De-Encapsulate	Insert / Delete	20	0 (NETWORK)

FIGURE 35

CMD Function	CMD #	TXM CMD MNEUNIONIC	Source Context	Source Offset	Destination Context	Destination Offset	Length
Replace MAC DA	1	TXM_CMD_REPLACE	--	--	1.2	0	6
		TXM_CMD_DATA	--	--	--	--	6
Replace MAC SA	2	TXM_CMD_REPLACE	--	--	1.2	6	6
		TXM_CMD_DATA	--	--	--	--	6
Replace VLAN ID	3	TXM_CMD_REPLACE	--	--	1.2	14 (no DID)	2
		TXM_CMD_DATA	--	--	--	--	2
TTL Decrement IPv4	4	TXM_CMD_DECREMENT	L3	\$	L3	8	1

FIGURE 36

CMD Function	CMD #	TXM_CMD_MNEUMONIC	Source Context	Source Offset	Destination Context	Destination Offset	Length
Replace MAC DA	1	TXM_CMD_REPLACE	--	--	L2	0	6
Replace MAC SA	2	TXM_CMD_REPLACE	--	--	--	--	6
Replace VLAN ID	3	TXM_CMD_REPLACE	--	--	L2	6	6
IPv4 Encap	4	TXM_CMD_INSERT	--	--	--	--	2
TTL Decrement	5	TXM_CMD_DECREMENT	L3 Outer	8	L3 Outer	0	1
IPv4 Encap	6	TXM_CMD_INSERT	--	--	L3 Outer	0	8
IPv4 Encap	7	TXM_CMD_INSERT	--	--	--	--	8
		TXM_CMD_DATA	--	--	L3 Outer	0	4
		TXM_CMD_DATA	--	--	--	--	4

FIGURE 37

CMD Function	CMD #	TXM CMD MNEUMONIC	Source Context	Source Offset	Destination Context	Destination Offset	Length
Replace MAC DA	1	TXM_CMD_REPLACE	-	--	L2	0	6
Replace MAC SA	2	TXM_CMD_DATA	-	--	--	--	6
Replace VLAN ID	3	TXM_CMD_REPLACE	-	--	L2	6	6
IPv4 de-encapsulate	4	TXM_CMD_DELETE	-	--	--	--	6
Decrement Inner TTL	5	TXM_TTL_DECREMENT	L3 Inner	8	L3 Inner	8	1

FIGURE 38

CMD Function	CMD #	TXM CMD MNEMONIC	Source Context	Source Offset	Destination Context	Destination Offset	Length
Replace MAC DA	1	TXM_CMD_REPLACE	--	--	L2	0	6
Replace MAC SA	2	TXM_CMD_REPLACE	--	--	--	--	6
Replace VLAN ID	3	TXM_CMD_REPLACE	--	--	L2	6	6
IPv6 Encap	4	TXM_CMD_INSERT	--	--	--	--	6
TTL Decrement	5	TXM_CMD_DECREMENT_INSERT	L3 Outer	8	L3 Outer	0	1
IPv6 Encap	6	TXM_CMD_INSERT	--	--	L3 Outer	0	8
IPv6 Encap	7	TXM_CMD_INSERT	--	--	L3 Outer	0	8
IPv6 Encap	8	TXM_CMD_INSERT	--	--	L3 Outer	0	8
IPv6 Encap	9	TXM_CMD_INSERT	--	--	L3 Outer	0	8
		TXM_CMD_DATA	--	--	--	--	8

FIGURE 39

CMD Function	CMD #	TXM CMD MNEMONIC	Source Context	Source Offset	Destination Context	Destination Offset	Length
Replace MAC DA	1	TXM_CMD_REPLACE	--	--	L2	0	6
Replace MAC SA	2	TXM_CMD_REPLACE	--	--	--	--	6
Replace VLAN ID	3	TXM_CMD_REPLACE	--	--	L2	6	6
IPv6 Encap	4	TXM_CMD_INSERT	--	--	--	--	6
TTL Decrement	5	TXM_CMD_DECREMENT	L3 Outer	--	L3 Outer	0	7
IPv6 Encap	6	TXM_CMD_INSERT	--	--	--	--	7
IPv6 Encap	7	TXM_CMD_INSERT	--	--	--	--	8
IPv6 Encap	8	TXM_CMD_INSERT	--	--	L3 Outer	0	8
IPv6 Encap	9	TXM_CMD_INSERT	--	--	L3 Outer	0	8
		TXM_CMD_DATA	--	--	--	--	8

FIGURE 40

FIGURE 41

Function	CMD #	TXMI CMD MNEUMONIC	Source Context	Source Offset	Destination Context	Destination Offset	Length
Last Hope Route Address	1	TXMI_CMD_COPY	L3	10	L2	0	6
Replace MAC SA	2	TXMI_CMD_REPLACE	--	--	L2	6	6
Replace VLAN ID	3	TXMI_CMD_REPLACE	--	--	L2	14	2
Increment TC	4	TXMI_CMD_INCREMENT	L3	5	L3	5	1

CMD Function	CMD #	TXM_CMD_MNEUMONIC	Source Context	Source Offset	Destination Context	Destination Offset	Length
Replace MAC DA	1	TXM_CMD_REPLACE	--	--	L2	0	6
Replace MAC SA	2	TXM_CMD_REPLACE	--	--	--	--	6
Replace VLAN ID	3	TXM_CMD_REPLACE	--	--	L2	6	6
Replace EtherType	4	TXM_CMD_REPLACE	--	--	--	--	6
MPLS Label Insert	5	TXM_CMD_INSERT	--	--	Ether	0	2
TTL Decrement	6	TXM_CMD_DECREMENT	L3	8	MPLS	0	3

FIGURE 42

CMD Function	CMD #	TXM CMD MNEMONIC	Source Context	Source Offset	Destination Context	Destination Offset	Length
Replace MAC DA	1	TXM_CMD_REPLACE	--	--	L2	0	6
Replace MAC SA	2	TXM_CMD_REPLACE	--	--	--	--	6
Replace VLAN ID	3	TXM_CMD_REPLACE	--	--	L2	6	6
Replace EtherType	4	TXM_CMD_REPLACE	--	--	--	--	6
MPLS Label Insert	5	TXM_CMD_INSERT	--	--	MPLS	0	3
TTL Decrement	6	TXM_CMD_DECREMENT	L3	8	MPLS	3	1
MPLS Label Insert	7	TXM_CMD_INSERT	--	--	MPLS	4	3
TTL Decrement	8	TXM_CMD_DECREMENT	L3	8	MPLS	7	1

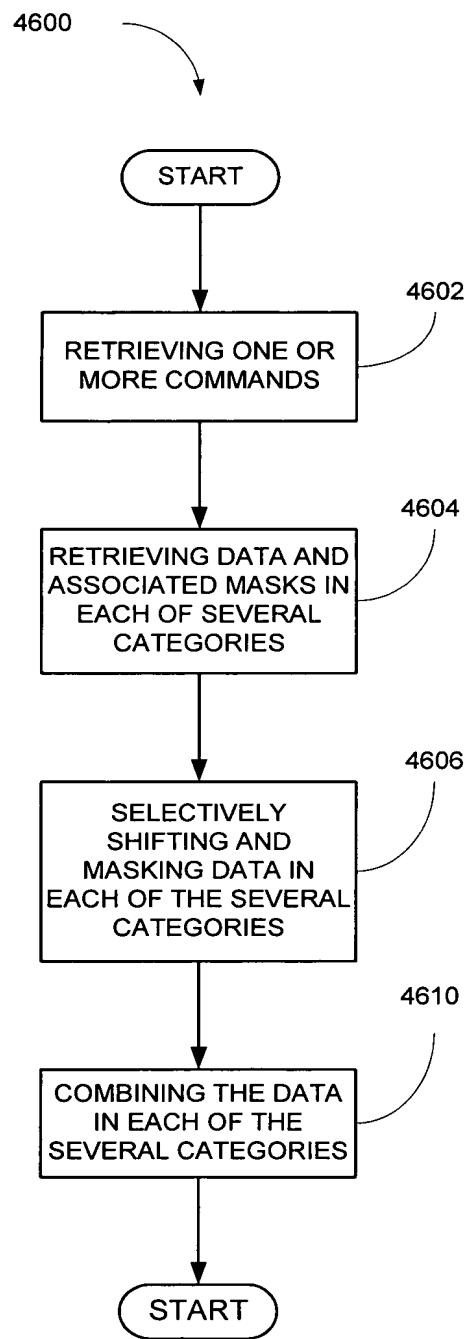
FIGURE 43

CMD Function	CMD #	TXM CMD MNEMONIC	Source Context	Source Offset	Destination Context	Destination Offset	Length
Replace MAC DA	1	TXM_CMD_REPLACE	--	--	L2	0	6
Replace MAC SA	2	TXM_CMD_DATA	--	--	--	--	6
Replace VLAN ID	3	TXM_CMD_REPLACE	--	--	L2	6	6
MPLS Label Insert	4	TXM_CMD_INSERT	--	--	MPLS	0	3
TTL Decrement	5	TXM_CMD_DECREMENT	L3	8	MPLS	3	1

FIGURE 44

CMD Function	CMD #	TXM CMD MNEMONIC	Source Context	Source Offset	Destination Context	Destination Offset	Length
Replace MAC DA	1	TXM_CMD_REPLACE	--	--	L2	0	6
Replace MAC SA	2	TXM_CMD_REPLACE	--	--	--	--	6
Replace WLAN ID	3	TXM_CMD_REPLACE	--	--	L2	6	6
TTL Decrement	4	TXM_CMD_DECREMENT	L3	\$	L3	\$	1
Replace IP DA or SA	5	TXM_CMD_REPLACE	L3	12/16	L3	12/16	4
Replace TCP/UDP Source or Dest port	5	TXM_CMD_REPLACE	L4	0/2	L4	0/2	2
		TXM_CMD_DATA	--	--	--	--	2

FIGURE 45



**FIGURE 46**

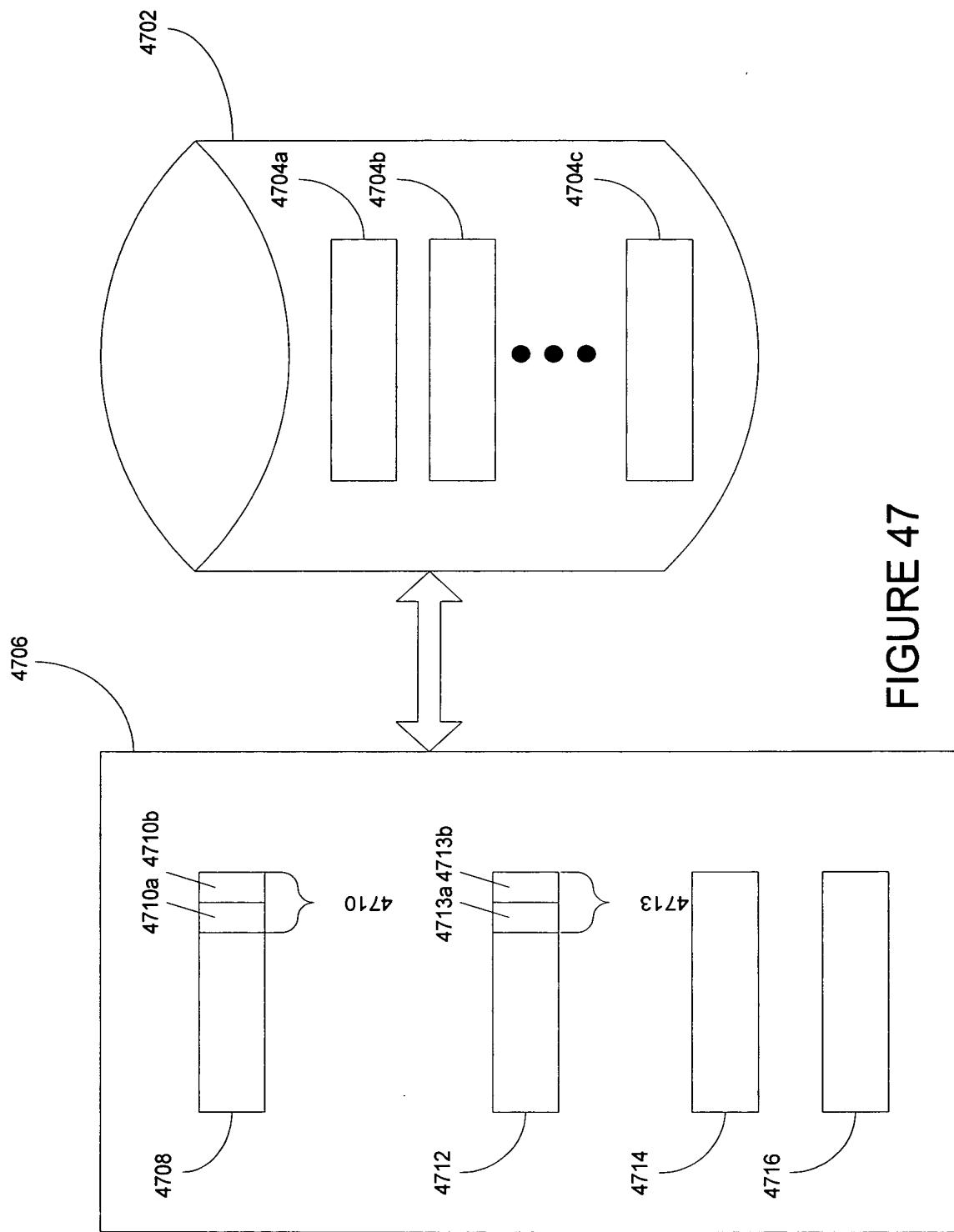


FIGURE 47

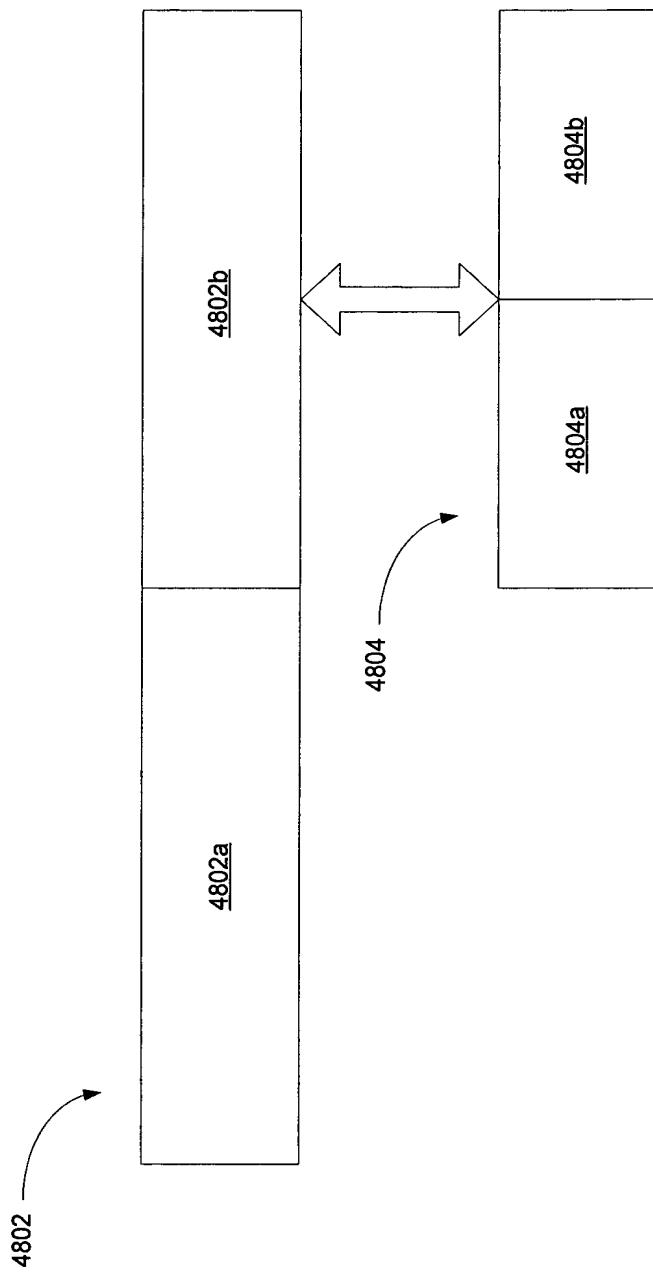


FIGURE 48

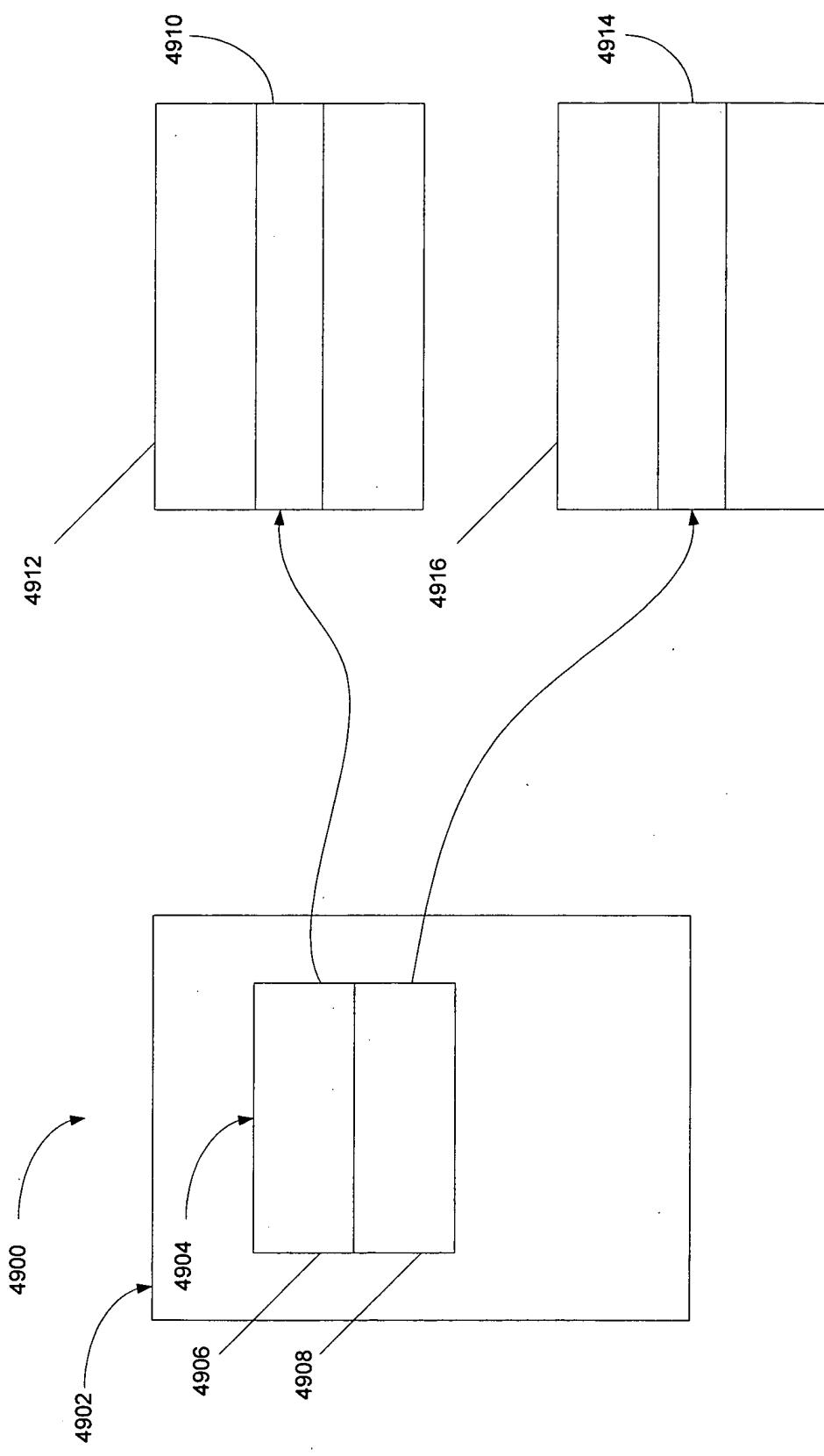
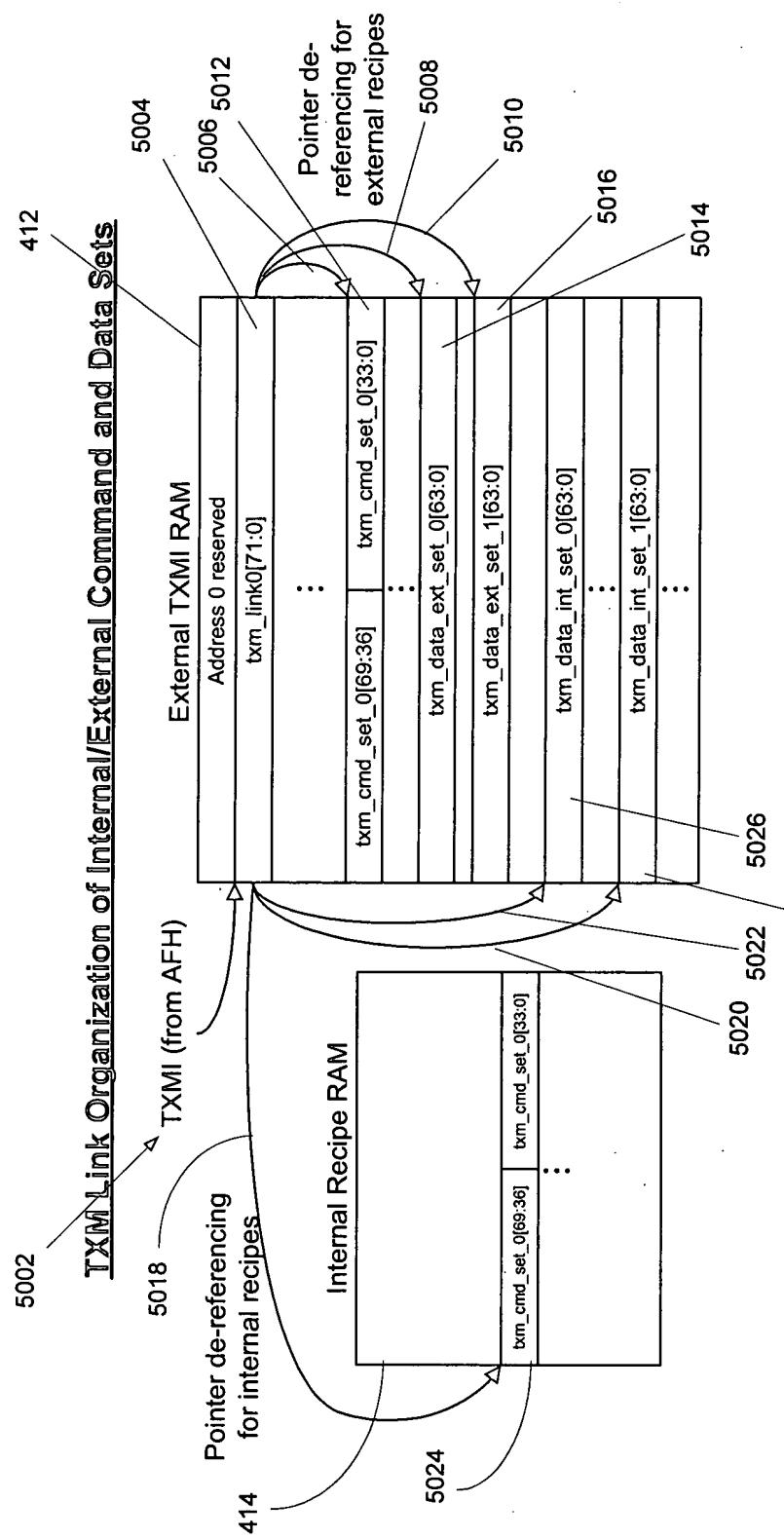


FIGURE 49



**FIGURE 50**

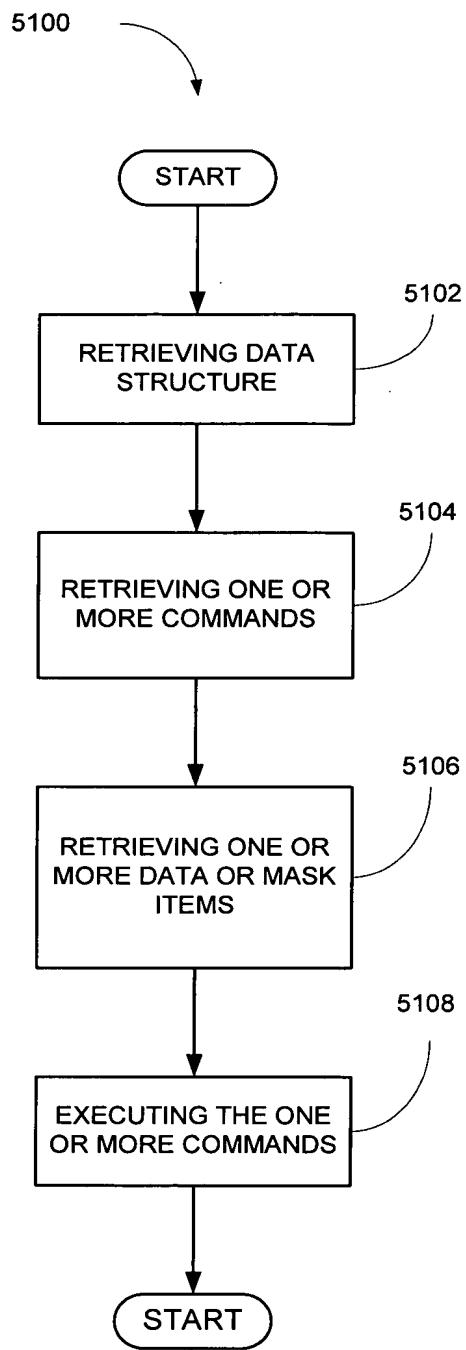


FIGURE 51

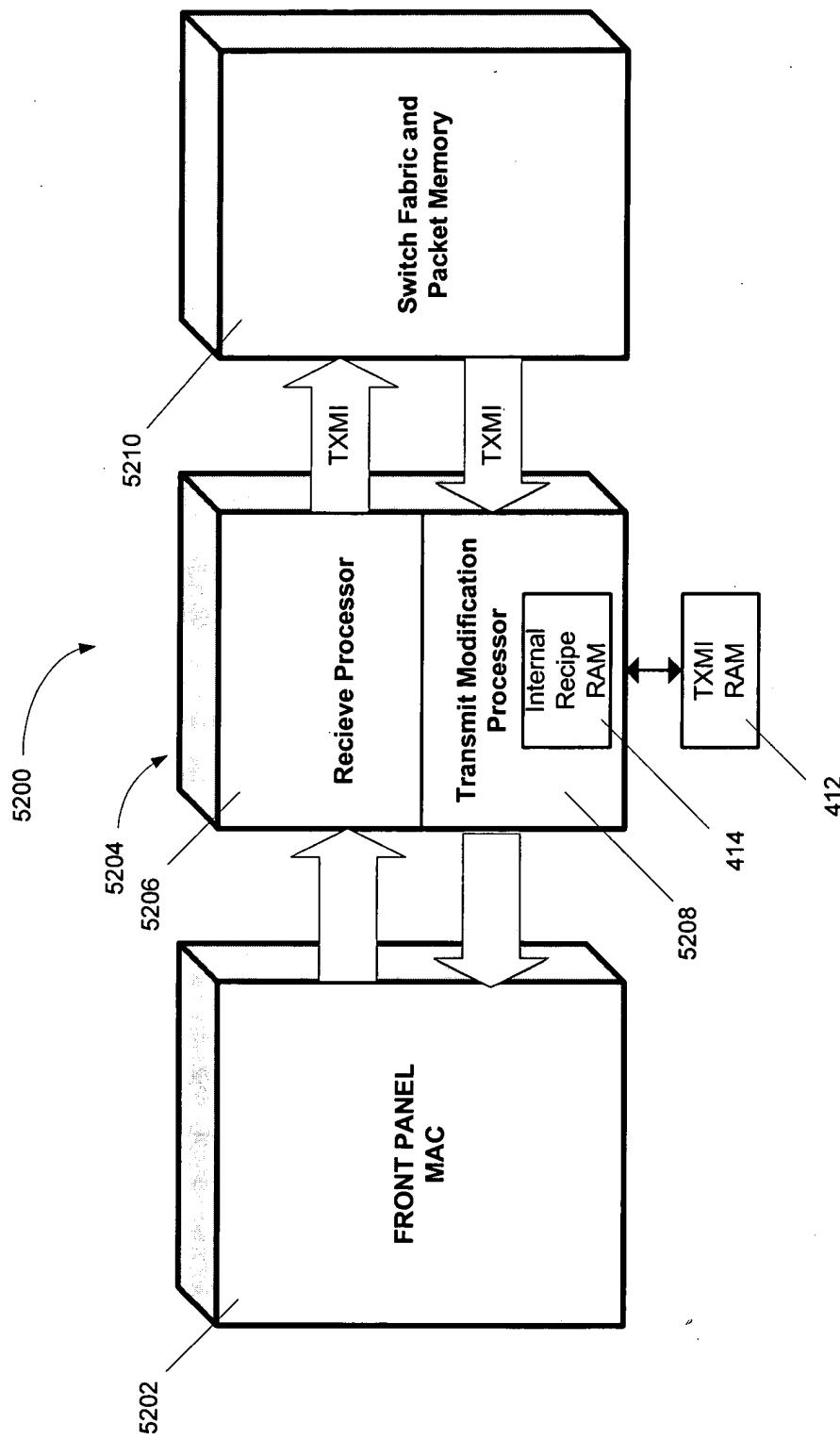


FIGURE 52